

Etiology and Pattern of Traumatic Dental Injuries (TDI) in the Primary Dentition of 4 to 6 Year old Children reporting to a Tertiary Dental Setting - a Descriptive Study

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Abstract:

Aims: The aims of the study were to assess the etiology and pattern of distribution of traumatic injuries to the teeth of 4 to 6 year old children reporting to tertiary dental setting, Kottayam and to compare the prevalence of these injuries between boys and girls.

Methods: Study group was selected from the patients reporting with a history of acute dental trauma and in the age group of 4-6 years. A detailed history of all the patients who were willing to take part in the study was taken, followed by a thorough extra and intra oral examination by trained examiner using a mouth mirror and dental probe. Intra-examiner consistency was assessed by kappa values on tooth-by-tooth basis. The chi square test was used to analyze any gender and age differences. Children with chronic medical conditions or other disabilities were excluded.

Results: Avulsion and mobility were the most prevalent, followed by crown fracture with only enamel involvement. Highly significant differences was found between boys and girls for avulsion of teeth and Crown fracture involving enamel, dentine ($P < 0.001$). The commonest cause of injury was due to a fall (60%) and in 40% of cases, the injury occurred at home.

Conclusions: The prevalence of traumatic injuries to the anterior teeth of the 4 to 6 year olds who took part in this study was very high. There is a need to run educational programmes to increase parents' awareness of the risks of dental trauma.

Keywords: Dental Trauma, Injury, Prevalence, Primary Teeth

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I. Introduction

Dental trauma has a substantial impact in the psychology and aesthetic of the patient and lays an everlasting effect on the behavior of the patient.¹ Primary dentition plays an important role in the functional and psychological aspects of child development, which may contribute to new studies focused on trauma in the primary dentition. It has been reported that one-third of preschool children and one-quarter of all children suffer from Dental Traumatic Injuries.² The incidence of dental trauma is likely to increase in the future because of an increase in recreational and sports activities in school-aged children and may exceed that of caries and periodontal diseases.³ Early treatment of Traumatic Dental Injuries (TDI) is fundamental, not only for correct diagnosis but also to provide an adequate treatment plan that will have an important repercussion on the prognosis of the affected teeth (Bakland & Andreasen, 2004).⁴ The aim of this study was to analyze the etiology, pattern and distribution of dental injuries in 4 to 6 year old children and to decide upon the target population for developing a preventive protocol against TDI. This study was done among children reporting to the Department of pediatric dentistry, GDC, Kottayam.

II. Materials and Methods

This descriptive cross-sectional study was carried out at the outpatient wing of department of Pedodontics, Govt Dental College, Kottayam. Informed written consent was obtained from all the parents of children between 4 to 6 years of age with TDI. A detailed history of all the patients who were willing to take part in the study was taken, followed by a thorough extra and intra oral examination by trained examiner using a mouth mirror and dental probe. Data was entered and analyzed by using SPSS version 16.0. Quantitative variables like age were presented as Mean and Standard Deviation. Qualitative data like sex and patterns of dental trauma were presented as frequency and percentage.

III. Results

During the 18 month period, a total of 105 patients under the age of 6 years who reported with trauma to primary teeth were included in the study.

3.1 Age and gender: The age and sex distribution of patients is given in Table 1. Of the 105 patients, 63 were boys (60.8%) and 42 were girls (39.2%).

Table 1: Gender distribution of dental trauma in various age groups.

Age	Male	Female	Total
4	10	7	17
5	21	13	34
6	32	22	54
Total	63	42	105

In total, 44 patients (41.2%) presented with 1 affected tooth, 41 patients (39.2%) with 2 affected teeth and 16 patients (19.6%) with 3 or more affected teeth. With the exception of 1 patient, all injuries were to the maxillary arch.

3.2 Pattern and distribution of dental traumatic injury: Of these children, 20 had crown fractures with enamel involvement, 11 had crown fractures with enamel and dentine involvement, 23 had mobility of the teeth and 19 had tooth discoloration. The least prevalent traumatic injury was found to be crown fracture involving enamel, dentine and pulp and was 7 cases. Dental trauma was more prevalent in boys than girls, with highly significant differences found especially for crown fracture involving enamel, dentine and avulsion ($P < 0.001$) (Table 2).

Table 2: Pattern and distribution of dental injuries

Type of injury	Male	Female	Total
Crown fracture involving enamel	12	8	20
Crown fracture involving enamel, dentine	8	3	11
Crown fracture involving enamel, dentine and pulp	5	2	7
Discoloration	10	9	19
Avulsion	15	10	25
Mobility	13	10	23
Total	63	42	105

3.3 Etiology

62% of TDI occurred due to a fall, with the other possible answers accounting for the other 38%. The site of accident was reported to be highest at home (42%), the next commonest place was at school (25%) (Table 4).

Table 4: Cause and Site of Accident

Cause of accident	Percentage
a) Fall	62%
b) Road traffic accident	18%
c) sports	13%
d) other	7%
Site of accident	
a) home	42%
b) school	25%
c) street	5%
d) park	8%
e) play ground	17%
f) other	3%

IV. Discussion

Children, during the milestone of development, involve actively in sports and other physical activities and are prone to fall which could be the reasons for these TDI. The present study was undertaken to determine the etiology and pattern of TDI and also to determine whether or not there was any difference in the prevalence of such injury with regard to gender and age. In the current study, the prevalence rate was higher in boys than girls in all the age groups (4, 5 and 6 year olds) and the difference was statistically significant ($P < 0.001$). This finding was in common with the results of previous studies^{5,6} and may be attributed to their active involvement in sports, outdoor activities and aggressive behavior.

The current investigation revealed that avulsion (23.81%) and mobility (21.9%) were the most prevalent manifestation of dental trauma in primary dentition, followed by discoloration (18.09%), and least prevalent were fractures involving pulp (6.6%). This could be due to higher elasticity of the bone in children that has the ability to absorb more energy of impact favoring luxation injuries. Secondly, smaller crown and roots favor dislocation rather than fractures.⁷

A similar study in Irish children, found discoloration of teeth to be the most prevalent condition other than enamel fractures.⁸ Another study, which surveyed Turkish children, found that avulsion and crown fracture were the most frequent injuries in the group studied.⁹ In the current study, it was found that the home (42%) followed by school (25%) were the main places where dental trauma occurred and falls (62%) followed by RTA (18%) were the commonest causes of dental trauma. The higher prevalence at home environment may be due to lower outdoor activities in the study population as younger children spend more time with their parents/caretakers. As one author has suggested, perhaps it is the activities one takes part in and the environment, rather than gender and age that determine the occurrence of dental trauma.¹⁰ The preponderance of boys is attributed may be due to the fact that their physical activity is more intense than that of girls.^{5,6} This emphasizes the need for prevention via meetings with groups of parents to raise their awareness of the risk of dental trauma as well as other oral and general health problems.

Trauma to the primary dentition can cause damage to the future permanent dentition, the most common problems being discoloration of enamel and/or enamel hypoplasia, cessation of root formation and retention due to ankylosis.¹¹ The timely treatment of dental trauma is therefore important, but in Indian children due to parental ignorance, cost, inaccessibility to dental care and the general trend of ignoring the health of primary dentition, timely treatment of TDI in children has been elusive.

V. Conclusion

Epidemiological knowledge of TDI adds valuable information on public health and when associated with clinical observations and trials, it provides essential evidence to all the science segments.¹² Moreover, the changing lifestyle and requirements of modern society leads to emergence of new patterns of dental trauma i.e., regular update of knowledge in dental traumatology is required. Traumatic injuries involving teeth can have a significant negative effect on the psychological, functional and aesthetic well being of a child and all possible efforts have to be put in place to prevent such injuries by educating the parents as well as the child.⁹ As this study indicates that most of TDI in primary dentition occurs in the home environment, directing these efforts towards the parental awareness could help them to child proof their homes so as to minimize TDI and to make first aid decisions that could greatly reduce the morbidity associated with TDI. Additionally, educational campaigns and preventive programs on dental trauma must be organized to improve caregivers' knowledge on emergency management of acute dental trauma.

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